Gravitational Acceleration

Name: _____ Section: 2AL-___ Date performed: __/__/__

Lab station: ____ Partners: _____

Computing the standard value

(Q-1) Calculate the standard value of g at CCSF.

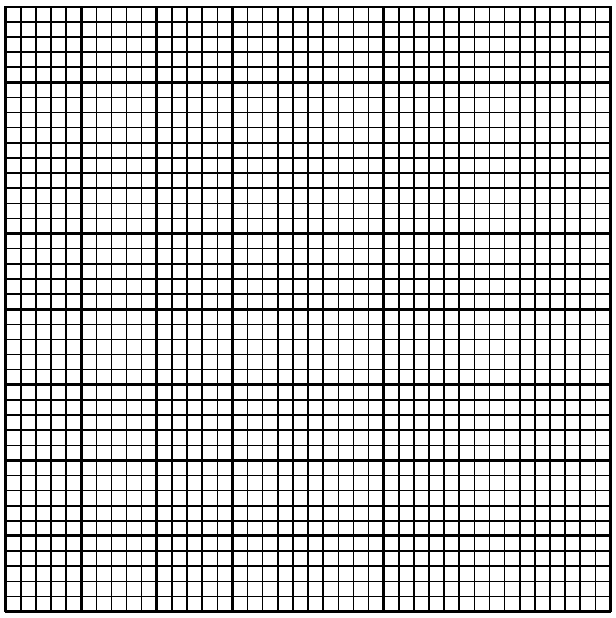
$$g_{\text{std}} = (\_\_\_\_\_ \pm 0.01)\,\text{cm/s}^2 = (\_\_\_\_\_ \pm 0.0001)\,\text{m/s}^2$$

Measuring g using the Haddock Intervalometer

(Q-2,3) Measure the fall time (t) for eight different fall heights (h) and fill in the following table.

h (m)	$2h$ (m)	Measured times (s)					t_{avg} (s)	t^2 (s^2)

(Q-4) Plot $2h$ vs. t^2. Don't forget to put a title on the graph and label the axes *with units*.



(Q-5) Use the graph to calculate g_{meas}, with uncertainty.

$$g_{\text{meas}} = (\_\_\_\_\_ \pm \_\_\_\_\_)\ \text{m/s}^2$$

Which rule did you use to compute the uncertainty of g_{meas}?

Comparing standard and measured values

(Q-6) Does g_{std} agree with g_{meas}? Explain.

Exercises

Determine the right-hand side of Eq. (9) in the lab text, and derive it from Eq. (8).

The plot $2h$ vs. t^2 should be

(A) a curve.
(B) a straight line whose slope is equal to g.
(C) a straight line whose slope is equal to $2g$.
(D) a straight line whose y-intercept is equal to g.
(E) a straight line whose slope is equal to $1/g$.
(F) not enough information to tell.

Explain with the help of Eq. (9):

The fall height (h) should be measured

(A) from the bottom of the ball while it is mounted on the electromagnet to the floor.
(B) from the bottom of the ball while it is mounted on the electromagnet to the top of the floor switch.
(C) from the bottom of the electromagnet to the top of the floor switch.
(D) from the top of the plastic pipe on which the electromagnet is mounted to the tip of your lab partner's nose.

How would g_{std} be affected if you moved to a location which is at the same lattitude as CCSF, but higher above sea level?

(A) g_{std} would be unaffected.
(B) g_{std} would increase.
(C) g_{std} would decrease.
(D) Not enough information to tell.

Explain:

How would g_{std} be affected if you moved to a location which is at the same height above sea level as CCSF, but farther north?

(A) g_{std} would be unaffected.
(B) g_{std} would increase.
(C) g_{std} would decrease.
(D) Not enough information to tell.

Explain: